REMARKS

In the Official Action mailed April 30, 2007, claims 1-8, 10-22, 28-41, 43-58, 60-62, and 67, 78, 79, 81, and 82 were examined, with the following issues being raised:

1. Claims 1-8, 10-18, 22, 28-41, 43-47, 49-58, 62, 67, 81, and 82 were rejected under 35 U.S.C. § 103(a) as being obvious over U.S. Patent No. 5,343,490 to McCall in view of U.S. Patent No. 6,259,717 to Stone et al.;

2. Claims 19 and 48 were rejected under 35 U.S.C. § 103(a) as being obvious over the McCall and Stone references further in view of the article by Grayal et al. entitled "High-Q wet-etched GaAs Microdisks Containing InAs Quantum Boxes";

3. Claims 20, 21, 60, and 61 were rejected under 35 U.S.C. § 103(a) as being obvious over the McCall and Stone references further in view of the article by Chu et al. entitled "Observation of Enhanced Photoluminescence in Erbium-Doped Semiconductor Microdisk Resonator"; and

4. Claims 78 and 79 were rejected under 35 U.S.C. § 103(a) as being obvious over the McCall and Stone references further in view of the article by Vollmer et al. entitled "Protein detection by optical shift of a resonant micro-cavity".

Claims 68-77 and 80 were previously withdrawn following a restriction requirement.

The Official Action cited the McCall and Stone references as the basis for obviousness rejections over all claims currently pending in the present application. The MPEP has set the following standard for establishing a *prima facie* case of obviousness:

> To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). *See* MPEP § 2143 - § 2143.03 for decisions pertinent to each of these criteria.

MPEP § 2142. While the McCall and Stone references clearly teach the desirability of an ultra-high Q micro-cavity, they fall far short of teaching how to make such a cavity, both individually and in combination. The McCall and Stone references therefore do not engender a reasonable expectation of success for the creation of an ultra-high Q micro-cavity, and thus they are insufficient to establish a *prima facie* case of obviousness over the rejected claims.

Claim 1 is directed toward “An ultra-high Q micro-cavity resonator”, which comprises “an ultra-high Q micro-cavity having a Q value of at least 1.00 x 10^8”. Neither the McCall reference nor the Stone reference teach such an ultra-high Q micro-cavity to the extent that one skilled in the art would have a reasonable expectation of success when seeking to make such a micro-cavity based on the descriptions provided. The McCall reference discloses several configurations for micro-cavity resonators, but the Q values for those resonators are not specifically discussed. In contrast, the Stone reference does discuss Q values for micro-cavity resonators, but it still fails to teach the skilled artisan how to make an ultra-high Q micro-cavity. The entire discussion included in the Stone Reference about Q values is contained in Column 4, lines 3-36. Particularly, with reference to Fig. 5, the Stone reference states the following about the relationship between Q value and the shape of a micro-cavity resonator:

> The shapes of the cross-section for three values of epsilon are shown in FIG. 5, where we also plot Q versus deformation for this ARC (*obtained by numerical solution of the wave equation*). Note that at roughly 10% deformation the Q value is in the range 10^4 which we estimated above was optimal for lightwave communications; whereas for symmetric resonators the intrinsic Q is much too large. (Emphasis added.)

In other words, the plot of Q values in Fig. 5 of the Stone reference is nothing more than a theoretical comparison of the deformation of a micro-cavity resonator with the calculated Q value for the resonator. This description does not actually teach or disclose how to make an ultra-high Q micro-cavity having a Q value of at least 1.00 x 10^8. Rather, it teaches that an ultra-high Q micro-cavity is merely a theoretical possibility.

For the above reasons, the combination of the McCall and Stone references does not provide the skilled practitioner with a reasonable expectation of success when attempting to make an ultra-high Q micro-cavity resonator as recited in claim 1. As such, the McCall and Stone references do not establish a *prima facie* case of obviousness over claim 1.

Independent claims 29 and 67 also include recitations of micro-cavities having Q values of at least 1.00 x 10^8. For the same reasons stated above in reference to claim 1, the combination of the McCall and Stone references does not establish a *prima facie* case of obviousness over claims 29 and 67.

Each of claims 2-8, 10-18, 22, 28, 29-41, 43-47, 49-58, 62, 81, and 82 depends from one of claims 1, 29, or 67 and was rejected using the combination of the McCall reference and the Stone reference as the primary basis for a finding of obviousness. Where this combination does not establish a *prima facie* case of obviousness over the parent claim, it also does not establish a *prima facie* case of obviousness over any of the dependent claims unless additionally cited references fill in the gaps in the teaching of the combination. For each of these dependent claims, where additional references are cited as part of the rejection, none of those references teach or disclose material which would establish a *prima facie* case of prior art over the dependent claim.

Claims 78 and 79 have been amended to include the limitation of "1.00 x 10^8" for the ultra-high Q micro-cavity resonator. These claims were rejected as obvious over the McCall reference in view of the Vollmer reference. As indicated above in reference to claim 1, the McCall reference does not teach or disclose any specific information about the Q value of a micro-cavity resonator. As such, the combination of cited references does not establish a *prima facie* case of obviousness over amended claims 78 and 79.

In view of the above, reconsideration of the rejections is requested.

Respectfully submitted,

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